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AUTHOR Lotan, Rachel A.; Navarrete, Cecilia
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ABSTRACT

An analysis of implementation of educational change distinguishes between three kinds of processes: mutual adaptation, cooptation, and nonimplementation. Mutual adaptation was defined as the process in which implementation was successful, and in which significant changes in participant attitudes, skills and behavior occurred. Implementation was characterized by a process in which project goals and methods were modified to suit the needs and interests of participants and in which participants changed to meet the requirements of the project. This paper elaborates and expands the definition of mutual adaptation to include: (1) the adaptive process of an innovative program and its implementers; and (2) the dynamic interaction between program developers and trainers, i.e., innovators on the one hand, and program implementers on the other. The conceptualization of this definition is illustrated through the study of the implementation of an innovative instructional approach called "Complex Instruction." It is demonstrated how this dynamic interaction between developers of educational innovations and its implementers has led to adaptations in the innovation, in the training model provided by the innovators, in the behaviors of the participants and in their organizational context. These adaptations have improved and strengthened the program and made it more effective. (JD)

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THE PROCESS OF MUTUAL ADAPTATION: A STUDY OF AN INNOVATIVE PROGRAM

Rachel A. Lotan

Stanford University

Cecilia Navarrete

Interface Consultants, Inc.

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1 Introduction

In her analyses of issues concerning implementation of educational change, McLaughlin (1978) distinguishes between three kinds of processes: mutual adaptation, cooptation and nonimplementation. Mutual adaptation, contrary to the two other kinds of processes, described successfully implemented projects and was defined as follows: "Where implementation was successful, and where significant change in participant attitudes, skills and behavior occurred, implementation was characterized by a process of mutual adaptation in which project goals and methods were modified to suit the needs and interests of participants and in which participants changed to meet the requirements of the project" (p.21).

In this paper, we will elaborate and expand McLaughlin's definition of "mutual adaptation" to include a) the adaptive process of an innovative program and its implementers, and b) the dynamic interaction between program developers and trainers i.e., innovators on the one hand, and program implementers on the other. We will illustrate our conceptualization of this definition through the study of the implementation of an innovative instructional approach called "Complex Instruction". We will attempt to show how this dynamic interaction between developers of educational innovations and its implementers has led to adaptations in the innovation, in the training model provided by the innovators, in the behaviors of the participants and in their organizational context. . These adaptations have improved and strengthened the program and made it more effective.

2 Conceptual Framework

One of the most important findings reported in the literature on educational change is that there are more differences regarding implementation within programs than there are between them. This suggests that the determinants of implementation are more important variables than features of the innovative program itself. There are numerous factors that influence the translation of a theory or an idea into actual classroom practice: the nature of the problem that produces the decision to innovate; clarity of this decision and of the innovation itself; monetary and human resources; political climate; organizational characteristics of the educational institution and its environment; established mechanisms of coordination, control and evaluation; issues of leadership; characteristics of participants (see Sarason (1971), Gross,Giacquinta and Bernstein (1971), Smith and Keith (1971), Herriott and Gross (1979), Baldridge and Deal (1975), Goodlad (1975), Baldridge, Deal and Ingols (1983)).

One of the more outstanding studies is the Rand Change Agent Study conducted between 1973 and 1977. Reports of the study mostly authored by Berman and McLaughlin were published in eight volumes between 1975 and 1979. Berman and McLaughlin's analysis of the enormous amount of data that included surveys, interviews, observations and some of them at different points in time had far reaching implications. Among their much cited conclusions is the one that states that innovations tended to disappear after the federal monies for their support had ceased. Where innovations continued, they were, more often than not, distorted and thus resembled what had been done before anyway.

Another extensive study is the recently published, ten volumes DESSI (Dissemination Efforts Supporting School Improvement) study which, in many ways, is a continuation of the Rand study. Among

the more significant findings of the DESSI study are the following: a) far-reaching and significant changes can be found in schools in which school improvement programs are supported by federal agencies; b) forceful leadership is an important predictor of major, effective and long-lasting changes in the classroom; c) new practices entailing a significant amount of change live or die by the amount of personal assistance to the users (teachers).

Michael Fullan's book, The Meaning of Educational Change, published in 1982, is a comprehensive summary of the literature in the field. Fullan discusses problems of change and deals with concepts like adoption, implementation and continuation and the factors affecting them. He also looks at educational change at the various levels of the educational system. In his analysis of the consequences of a policy decision and its putting into practice, he discusses the role of the teacher, the principal, the district administrator, the inside and the outside consultant, the parent and the community; he then broadens his discussion and talks about educational change at the regional and the national level with particular emphasis on professional preparation and staff development.

Although interest in the different aspects of the change and the implementation processes is as strong as ever before, analysts seem to focus lately more and more on the classroom level and the role of the teacher as change agent. It is at the classroom level that one is likely to observe grave distortions of the innovation's initial goals but also it is there that one can expect and hope for the realization of desired outcomes.

In his book, Fullan makes the following unequivocal statement: "Educational change depends on what teachers do and think - it's as simple and as complex as that... If educational change is to happen, it will *require* that teachers understand themselves and be understood by others." The importance of the teacher as

actual implementer of any proposed change. the "street-level bureaucrat" (Weatherly and Lipsky, 1977), the one in direct and immediate contact with the students/clients of the organization (Elmore, 1978; 1980) is evident. Success of failure of the implementation depends ultimately on the teacher's and his/her students' performance in the classroom. This is the reason why educational organizations have invested time, money and effort in the professional development of the institutional staff and why, today, one can hardly exaggerate the necessity and the significance of staff development. Recent studies (McLaughlin and Marsh, 1978; Staff Development, The Eighty-second Yearbook of the National Society for the Study of Education, 1983,Part II) imply, however, that professional development of the teacher as an individual participant in the educational institution is insufficient; the organizational context of the teacher's reality and the consequences of any actions within this context cannot and should not be disregarded or neglected. Any demand for change in the traditional instructional practice should be accompanied and supported by changes in the organizational environment in which the teacher operates. Thus, the organizational context of the innovative teacher should allow for intensive and direct interaction - from training to feedback and evaluation of the implementation performance- between the teacher and the innovators.

This argument is of particular importance for programs that require a change in classroom organization "change in the traditional roles, behavior, and structures that exist within the school organization or the classroom...(in) the ways that students, teachers, parents, and administration relate to each other (McLaughlin, 1978, p.19). McLaughlin continues as follows: "Because classroom organization projects require teachers to work out their own styles and classroom techniques within a broad philosophical framework, innovations of this type cannot be specified or packaged in advance. Thus, the very nature of these

projects requires that implementation be a mutually adaptive process - between the user and the institutional setting - that specific project goals and methods be made concrete over time by the participants themselves" (id., p. 20).

Although making project goals and methods concrete, i.e., relevant to a given situation and to the needs of the implementers is a necessary condition for successful implementation, McLaughlin does not account for unanticipated and possibly negative outcomes of such a process. For example, the initial goals of the program could have become displaced or misrepresented; "adaptation" went so far that the instructional methods and techniques proposed and/or prescribed by the program have become gravely distorted; misguided eclecticism or unsuitable combination of innovative techniques significantly weaken or even undermine the effectiveness of the proposed innovation.

In order to prevent this from happening, we propose to include the following elements into a model of the successful implementation process:

- adequate staff development (including training and feedback on performance) by program developers to ensure a thorough understanding by implementers of the knowledge base underlying the proposed innovation (for a detailed examination of this topic see Lotan, 1985);

- on-going evaluation of the implementation process by the innovators themselves for the dual purpose of quality control and improvement of the training as well as the implementation model;

- further development and research in different settings on aspects of implementation leading to adjustments and incorporation of findings into the training and the implementation model.

3 An Innovative Instructional Approach - Finding Out/Descubrimiento

These aspects of the dynamic interaction between developers of innovations and implementers as described above, have been a major concern to the Program for Complex Instruction at Stanford University. This Program was established by Drs. Elizabeth G. Cohen and Edward A. De Avila, and at present is under the directorship of the former. Since 1979, the Program for Complex Instruction at Stanford University School of Education has implemented and evaluated the innovative instructional approach exemplified in Finding Out/ Descubrimiento. This approach is particularly suitable for settings where children exhibit a wide range of academic and linguistic skills. Evaluation has documented the capacity of the program to bring the classrooms up to grade level in math and science (as well as in reading) according to national norms on standardized achievement tests (De Avila, 1981, Cohen and De Avila, 1983). In addition, evaluation of implementation has shown that the teacher training methods used in this approach are highly effective in producing classrooms which consistently display those features of the program that are related to the learning gains (Cohen and De Avila, 1983).

At present, Finding Out as developed at Stanford, is being implemented in the Bay Area in eight districts, 73 regular classrooms, seven Language Development Centers, one Special Day Class and one Migrant Education Lab. We estimate that approximately 2500 students are benefitting from their experience with Finding Out/ Descubrimiento during the present academic year. Recently, the San Jose Unified School District gained local and national recognition for the implementation of Finding Out/ Descubrimiento by receiving the Exemplary Program

Award from the offices of Santa Clara County and the Center of Excellence Award from the National Council of Teachers of English.

3.1 Extent of Evaluation

Table 1 summarizes the activities of the Program for Complex Instruction since 1978 and shows the extent to which the approach was documented and evaluated. This table identifies the considerable variety of data sources as well as the different kinds of data collected by the Finding Out project at Stanford. In this paper, we report but a fraction of the findings detailed in evaluation reports and doctoral dissertations that examined various aspects the implementation of the innovation.

Table 2

Data Base for Evaluation of Finding Out/Descubrimiento

1979 - 1986

YEAR	DATA SOURCES	DATA BASE
1979/80	Achievement Measures Classroom Observations Teacher Observations Target Child Observations Sociometric Questionnaires Team Meeting Measures	5 Districts 9 Schools 9 Classrooms
1982/83	Achievement Measures Classroom Observations Teacher Observations Target Child Observations Sociometric Questionnaires Tapes of Feedback Meetings Interviews with Principals and Teachers Documentation of Organizational Model Videotapes of Students Activities in one 2nd Grade Classroom	3 Districts 10 Schools 15 Classrooms
1983/84	Achievement Measures	1 District 9 Schools 17 Classrooms
1984/85	Achievement Measures Classroom Observations Teacher Observations Target Child Observations Sociometric Questionnaires Tapes of Feedback Meetings Interviews with Principals, Teachers, Assistants and Support Staff Documentation of Organizational Support to Teachers Fieldnotes of Four Selected Classrooms	3 Districts 5 Schools 13 Classrooms
1985/86	Achievement Measures Teacher Observations Teacher Interviews Videotapes of Selected Teachers	4 Districts 6 Schools 15 Classrooms

3.2 Description of the Program

Finding Out features multiple learning centers that operate simultaneously. Each center has science and math activities that are designed to develop thinking skills and facilitate the acquisition of math and science concepts. The activities allow children who differ in cognitive development to carry out the same task in a manner appropriate to the individual's developmental level. Every child must complete the task and worksheet for each center. Basic skills are placed within a meaningful context from the child's point of view.

There are 130 activities grouped around 17 themes. Basic concepts are repeated at different learning centers so that if a concept is not understood at one center, it will eventually be grasped at one of the other centers. Instructions and worksheets are in English, Spanish and pictographs. Activities are intrinsically interesting, producing very high levels of task engagement. Evaluation in 1982/83 showed that less than half of one child was disengaged per classroom (Cohen and De Avila, 1983).

Children are trained to work in cooperative groups and to take responsibility for their own and others' learning through the assignment of special roles in their small groups. Because the children can and do use each other as resources in the learning process, there is no need for ability or language grouping; the instructional approach can accommodate a wide range of cognitive development, linguistic proficiency and academic skills.

3.2.1 Peer Interaction

Analyses of data show that peer interaction is a central feature of the program and significantly associated with gains in conceptual learning. Major findings are summarized below.

1. The percentage of children talking and manipulating the materials was repeatedly shown to be correlated with the average gains in Math Concepts and Applications subscales of the CTBS battery (Cohen and Intili, 1981; Cohen and De Avila, 1983).

2. Rosenholtz (1981) found that the lateral relations among peers were a key source of task engagement in the Finding Out setting as compared to the regular math classes.

3. Stevenson (1982) found that the probability of individual children talking with each other about the task predicted the conceptual quality of their worksheets, holding constant their individual levels of academic achievement.

4. In an intensive study of a second grade classroom, Navarrete (1985) showed that the frequency of children seeking assistance from one another, receiving assistance and returning to their task was a predictor of gains in reading comprehension.

5. Neves (1983) studied the effects of peer talk on increased proficiency in the English language. She found that the frequency of talk among Spanish monolinguals was associated with gains in English proficiency.

3.2.2 Incorporation of treatments for status problems

For many years, Cohen has studied problems of status and their treatment in the classroom (see Cohen, 1982). In 1979, she documented the operation of status problems in Finding Out classrooms (Cohen, 1983). Those children who were seen as better in math and science and/or were more popular among their peers, had higher rates of peer interaction at the Finding Out learning centers. As a consequence, they learned more than their peers with lower status. Starting in 1982/83 the program trained teachers to implement a special status treatment designed to

ensure access to peer interaction for all students and, if possible, to improve expectations for competence in science and math held by and for low status children. A recently completed evaluation of the success of these status treatments (Cohen, Lotan and Catanzarite, in press) concluded that the impact of status on learning outcomes has been removed and access to interaction on the part of low status children has been greatly improved. Although high status children still appear to have higher expectations for competence, we have evidence that some children who were not initially seen as best in science and math in the fall of 1982 were more likely to be perceived as such by spring of 1983.

In another evaluation of status effects, Leal (1985) found that in Finding Out/Descubrimiento classrooms girls were just as likely to initiate interaction with boys as boys were with girls. There was no evidence of gender segregation as is so often the case in elementary classrooms. There were also no sex differences in achievement between boys and girls in Finding Out classrooms. Equal access to learning through peer interaction in science and math for boys and girls is particularly important when one considers the existing underrepresentation of women and the scarcity of such role models in science-based professions.

These and other findings (see also Mata, 1985; Lotan, 1985) have become part of the research and knowledge base underlying the innovation and were shared with the teachers during the training or the feedback sessions given by the Stanford staff. At present, more doctoral dissertations examine additional features of the implementation process, such as the organizational variables that affect implementation (Ellis, forthcoming), the role of the principal (Parchment, forthcoming), and the effects of the implementation of the management system on the role of the teacher (Zack, forthcoming).

4 Training for Implementation of the Innovation in 1979/80

1979/80, the initial year of implementation of Finding Out/ Descubrimiento served as a pilot study to evaluate the overall effectiveness of the program. Drs. De Avila, Cohen, Navarrete and other staff members who developed the innovative approach found, however, that effectiveness of the program, i.e., student learning outcomes varied from classroom to classroom. They hypothesized that these variations in program outcomes were related to variations in the implementation process which also varied from classroom to classroom. Based upon data gathered by the program, the researchers assessed the extent to which variation in implementation related to student outcomes.

Approximately 250 students in grades 2-4 from five school districts in the San Jose, CA area participated in Finding Out. Teachers were recruited through a recruitment survey sponsored by the San Jose Bilingual Consortium and through oral presentations by the Stanford staff. Only teachers who worked with at least one aide in the classroom and who used the aide in direct teaching of the children were selected for the study. This design decision was based on previous research indicating what teacher-aide teams who worked in this way were capable of close interdependence necessary for managing complex curriculum (Intili, 1977).

In-service training consisted of two parts. The first part was a three day workshop prior to the beginning of the school year. Teams practiced with selected activities from the curriculum; they were given a brief explanation of the rationale behind the activities in particular and project in general; they were given a description of classroom management for small group instruction and record-keeping associated with the activities; and they were given instruction on how to facilitate children's thinking, as

well as an introduction on how to make cooperation legitimate in small groups through the introduction of norms for offering and accepting assistance. Planning for effective team meetings was also introduced during the three day session as part of classroom management strategies. Complete teaching units, materials and a handbook were provided by the innovators for participating teachers. It is important to note that during this brief workshop teachers did not have a chance to practice the newly introduced behaviors. Also, since the project was considered a research study, the innovators did not "intervene" in the process, and during the school year did not provide formative feedback to the teachers.

The second part of the in-service was a day-long follow-up session conducted in December. This session was scheduled after most of the teachers completed three weeks of the activities. The purpose of the second in-service was to provide teachers with strategies for classroom management which, based on weekly observations, needed further strengthening. Teachers were also invited to share with one another and with the innovators their experiences and concerns with the innovation.

As part of the research study, five of the nine teacher teams participated in two additional workshops designed to teach the teams how to have effective team meetings. These teams were instructed on how to work together on problems arising from the innovation. In addition, they were taught how to make decisions about their classes in a reflective manner. The purpose of this treatment was to create "reciprocally interdependent" teams by showing the teachers and aides how to have effective meetings where both played supportive roles and to teach the teams how to make decisions that were both explicit and subject to evaluation (Cohen&Intili, 1982). Realizing that innovative teachers need organizational support, the Stanford staff worked closely with the local bilingual consortium and the principals of the schools to ensure a support system for the initial and continued use of

the new program.

5 Implementation and Outcomes of the Innovation in 1979/80

The program identifies student and teacher behaviors that are seen as promoting, supporting and mediating the learning process. When multiple learning centers are in simultaneous operation and authority is delegated by the teacher to the students, peer interaction increases. Thus, while students talk and work together while manipulating the materials, read the activity cards, write and complete their worksheets, learning takes place. Variations in the observed rate of these behaviors per classroom was one of the measures of program implementation. In the analysis of the data, these and other measures of implementation were related to learning outcomes (Cohen and Intili, 1981).

Another measure of implementation were the observed rates of highly skilled, non-routine teacher behaviors prescribed by the program. These behaviors support the students' learning processes by stimulating their thinking and by providing opportunities for students for active problem-solving, experimenting, hypothesizing and generalizing. In this paper, we are focusing on these two key areas of the program: students' learning processes and the teacher role.

5.1 Students' Learning Processes

Teachers were instructed to set up multiple learning centers in order to give children the opportunity to engage in an active sharing process of gaining information through reading and writing, talking and manipulating materials in order to complete the task. Table 2 shows the average proportions of children engaged in the prescribed learning behaviors in small groups as well as the range of the classroom proportions.

Table 2

Average Percent of Students Engaged

in Prescribed Learning Behaviors - 1979/1980

	Average	Range*
Reading and Writing	8.6	4 - 13
Talk and Manipulate	23.8	17 - 28
Manipulate only	20.6	11 - 31

* Range is from the smallest average percent observed per classroom to largest average percent observed per classroom.

Almost 24% of the students were engaged in simultaneous talking and manipulating the materials. The range of these variables attest to the considerable variation in these three variables. Observations revealed that teachers who were unable to manage the complexity of the new program, moved back to more traditional patterns of instruction by maintaining only a few learning centers which could be directly supervised. Fewer learning centers meant larger groups in which lateral relations, i.e., peer interaction were greatly diminished. Students who worked in larger groups had fewer opportunities to engage in active peer interaction and to complete the number of prescribed math and science activities (Cohen and Intili, 1981). This finding was significant in that students who were not exposed to the full program and were denied access the peer problem-solving did not perform as well on their achievement tests as did students who were exposed to multiple learning centers in small groups.

5.2 The Role of the Teacher

During the small group sessions, teachers were instructed to observe students, extend their conceptual understanding of the tasks, and give specific feedback on their progress. Detailed

analysis revealed a rather different profile: teachers were observed routinely supervising and directing students on how to accomplish the tasks. Teachers were unable to set up a management system in the classroom that would allow them to turn their attention to the highly skilled, non-routine behaviors required by the program. They were busy maintaining order, distributing materials, checking worksheets, and in general, facilitating completion of the task. Some teachers eliminated the small groups and rather than allowing students to experiment and find out by themselves, returned to direct instruction of the concepts taught in the curriculum.

6 Revision of the Training Model - Summer 1982

Changes in training for the 1982/83 implementation grew out of the analysis of the nature of the implementation problems described above. Having shown that it was possible to attain favorable learning outcomes under minimal training conditions, the innovators wanted to design an instructional program for teachers that would give them a more fundamental grasp of the instructional approach, its rationale and its importance. The rigorous evaluation of the implementation process and its outcomes put the innovators in a much better position to attain this goal and to document the features that were critical for achieving the goals of the program: improving the learning outcomes.

7 Training for the Implementation of the Innovation - 1982/83

Based upon evaluations of the 1979/80 implementation process and its outcomes, in the summer of 1982, the workshop for teachers was extended into a two week, intensive training program. The innovators provided an in-depth discussion and

practice of the underlying psychological and sociological theory of the program and its management. Research results from the 1979/80 study were shared with the participating teachers. During the second week, teachers were given the opportunity to practice their newly acquired skills in a simulated classroom setting with students heterogeneously grouped by language and age. Teachers were also instructed on how to observe and evaluate each others performances.

Results of the data analysis had impressed upon the innovators the importance of a classroom management system that would boost the observed rates of those student and teacher behaviors that were related to the learning gains. Therefore, a major feature of the 1982 workshop was the introduction of such a management system to the teachers. While in 1979/80, children typically moved between learning centers as individuals and worked with each other as needed, according to the new system, children were assigned to a group and a learning center for the entire instructional period. Only if all members of the group completed their worksheets, could they move to another learning center or extend the activity at their first center. This was done to increase interdependence since authority was delegated.

In order to prepare children for this new system of working in groups, a series of cooperative exercises were developed by the innovators. These exercises took the form of games which taught behaviors necessary for working in a group, such as: how to listen to each other; how to ask other people for their opinions; and how to help other people without doing the task for them. During the workshop, teachers experienced these "games" and also were shown how to train their students for cooperation.

In addition to the cooperative exercises, special roles were assigned to students in each group in order to help treat status differences and in order to accomplish many of the organizational tasks that teachers ordinarily do. A central role was that of a

facilitator whose responsibility was to see to it that everyone in the group received help when needed. Only the facilitator had the right to call the teacher for help. Thus, group members had to rely on each other for assistance and to turn to the teacher only when other alternatives had been exhausted. Another role was that of the Checker who saw to it that everyone completed their worksheets. Clean-up and set-up duties were allocated to the other group members. Each role was rotated at the end of each week or after the completion of a unit. New groups were also composed at the beginning of each unit to allow students to learn to practice and function with different types of students. During subsequent implementation, teachers introduced the role of the Reporter. This role was incorporated into the model of the program by the innovators at Stanford because it was recognized as useful.

In terms of the teacher role, the 1982 summer workshop included special sessions on talking to children about their thinking, asking substantive questions and extending the activities. One major effect of the classroom management system with cooperative training and roles for the children would be to free the teacher for the more open-ended, problem-solving interaction. Additional practice and group exercises were also provided in a follow-up workshop during the middle of the school year. Training included three sessions of formative feedback to the teachers by the Stanford staff. These sessions were designed as teaching and learning devices, during which members of the Stanford staff could time and again reinforce the concepts and the principles upon which the program was based. During the feedback sessions, the teachers and members of the Stanford staff identified implementation problems and discussed possible solutions. This active interchange contributed significantly to the process of "mutual adaptation" that we are describing in this paper.

In attempting to address the nature and consequences of status problems in the classroom, teachers were instructed to stress the

multiple abilities found in the Finding Out tasks (such as visual thinking, precision in measuring and recording, spatial ability, etc.) rather than just the ability to read and write (Cohen, 1982). The goal for teachers was to get across the idea to the children that everyone could expect to be good on at least one of these abilities and that no one could expect to be outstanding on all abilities.

8 Implementation and Outcomes of the Innovation - 1982/83

Reports of the data analysis for the 1982/83 implementation will be organized around the two main areas of concern described above : students' learning processes and teacher's role.

8.1 Students' Learning Processes

A primary concern of the innovators was to find out whether the observed rates of student behaviors such as reading and writing, talking and manipulating the materials, and manipulating the materials only were indeed boosted by the introduction of the new classroom management system. Table 3 provides relevant data to this issue.

Table 3

Average Percent of Students Engaged

in Prescribed Learning Behaviors - 1982/83

	Average	Range*
Reading and Writing	14.8	9 - 22
Talk and Manipulate	31.9	20 - 43
Manipulate only	29.4	20 - 42

* Range is from the smallest average percent observed per

classroom to largest average percent observed per classroom.

A juxtaposition of this table and Table 2 above, reveals significant differences in implementation between the two years. The implementation of the new management system that led to the successful maintenance of of more learning centers, the introduction of the new cooperative norms, and the use of student roles at the learning centers were associated with increased proportions of students engaged in the prescribed learning behaviors. Thus, improvements in the innovation did result in different and improved opportunities for students to engage in learning behaviors.

Another concern in this round of implementation was on the extent to which status differences were minimized. The researchers found that the teachers did not attain a satisfactory level of talking about multiple abilities and thus were not as successful as expected in implementing a status treatment. At present, the Stanford staff is working on the development of a training component that addresses this issue.

8.2 The Role of the Teacher

In order to establish and maintain the new small group management system in the classroom, teachers had to delegate authority and reduce the bureaucratic supervision at the learning centers. A valid indicator of delegation of authority and non-bureaucratic supervision was the percentage of students in small groups who were talking and working together while manipulating the activities.

It was apparent that the implementation of the new management system greatly improved teachers' interaction with students in small groups. Table 4 illustrates the rates of teacher behaviors in the two years of implementation. The numbers in the table represent an average number of times teachers were observed

talking in these categories in a ten minute period.

Table 4

Average Rate of Teacher Behaviors in 1979/80 and 1982/83

Behavior	Avg. # per 10 minutes	
	1979/80	1982/83
Facilitates	9.33	9.40
Instructs/Explains	2.66	5.31
Asks questions	1.54	11.29
Gives feedback	1.77	2.65
Extends Activity	0.07	0.99

In 1979/80, the most common type of teacher behavior was facilitation, a finding which was discussed earlier in this paper. With the management changes in 1982/83, there was a dramatic increase in the rate of asking substantive questions, from 1.54 to 11.29. Differences in all other categories were also statistically significant.

9 Implications and Conclusion

Through the dynamic interaction between the developers of an educational innovation and its users, the process of implementation was greatly enhanced. Adaptations of the innovation and the training model by both the innovators and the teachers increased the flexibility of the program while maintaining its essential characteristics and features.

The process of mutual adaptation as it was defined and described in this paper also illustrates the interaction between theory and research on the one hand, and practice on the other. When teachers incorporate an innovation into their repertoire of behaviors, they adapt the innovation to fit their particular

situation and needs. However, permissible and often unavoidable adaptations must take into account the theoretical basis underlying the innovation since otherwise they run the risk of violating or even counteracting the initial goal of the innovation.

Communication between teachers and the developers of innovations is crucial. Developers of educational innovations should take the training of teachers very seriously and address the issue of the development of teacher's conceptual clarity and understanding of the program. Teachers, on the other hand, are to be given the opportunity to share with the developers the adaptations they have invented. If legitimate, they could be incorporated into the innovation, making it richer, more flexible and more powerful. Evaluations of the innovation by the developers and incorporation of newly discovered findings into the implementation and training model also make the innovation more powerful. In that sense, Finding Out/Descubrimiento is a good example of a program that shows growth overtime and has developed into an integrative and innovative instructional approach rather than a specific and limited curriculum.

REFERENCES

Baldridge, J. and T. Deal. (eds.). Managing Change in Educational Organizations, Berkeley, Calif.: McCutchan, 1975.

Berman, P. and M.W. McLaughlin, Federal Programs Supporting Educational Change, Santa Monica, Calif.: Rand Corporation, 1975 - 1979.

Cohen, Elizabeth G., Expectation States and Interracial Interaction in School Settings, Annual Review of Sociology, 1982, 8, 209-235.

Cohen, Elizabeth G., "Talking and Working Together: Status, Interaction and Learning" in P. Peterson and L.C. Wilkinson (eds.) Instructional Groups in the Classroom: Organization and Processes, New York, Academic Press, 1983.

Cohen, E.G. and E.A. De Avila, Learning to Think in Math and Science: Improving Local Education for Minority Children, Final Report to the Walter S. Johnson Foundation, Stanford, California: Stanford University School of Education, December, 1983.

Cohen, E.G. and J.K. Intili, Interdependence and Management in Bilingual Classrooms, Final Report to NIE, Contract # NIE-G-80-0217, Stanford, California: Stanford University School of Education, August 1981.

----.Interdependence and Management in Bilingual Classrooms. Final Report to NIE. Contract #NIE-G-81-0217. Stanford, California: Stanford University School of Education. October 1982.

----,Learning Science in Bilingual Classrooms, Interaction and Social Status. Final Report to NSF, Grant # SED-80-14079, Stanford California: Stanford University, 1982

Cohen, E.G. with R.A. Lotan and L. Catanzarite, Can Expectations for Competence be Treated in the Classroom?,in M. Webster and M. Foschi (eds.), Stanford University Press, in press.

De Avila, E.A., E.G. Cohen and J.K. Intili, Improving Cognition: A Multi-Cultural Approach. Final Report to NIE, NIE Grant #NIE-G-78, MICA Project: Multi-Cultural Improvement of Cognitive Abilities, February 1981.

Ellis, Nancy. Collaborative Interaction and Logistical Support for Teacher Change, Dissertation in Progress, forthcoming.

Elmore, Richard. "Organizational Models of Social Program Implementation", Public Policy, 1978, 26(2), 185-228.

----,"Backward Mapping: Implementation, Research and Policy Decisions," Political Science Quarterly, 1979-1980, 94, 601-616.

Fullan, Michael. The Meaning of Educational Change, Teachers College Press, Columbia University, 1982.

Goodlad, J., The Dynamics of Educational Change, Toronto: McGraw Hill, 1975.

Gross, N., J. Giacquinta and M. Bernstein, Implementing Organizational Innovations: A Sociological Analysis of Planned Educational Change, New York: Basic Books, 1971.

Herriott R., and N. Gross, (eds.) The Dynamics of Planned Educational Change: An Analysis of the Rural Experimental School Program, Berkeley, Calif.: McClutchan, 1979.

Howey, K.R. and J.C. Vaughan, "Current Patterns of Staff Development", in Griffin, G.A. (ed). Staff Development, Eighty-second Yearbook of the National Society for the Study of Education, Part II.. Chicago, Illinois. NSSE, 1983. 92-117.

Intili, JoAnn K.. Structural Conditions in the School that Facilitate Reflective Decision Making, Unpublished doctoral dissertation, Stanford University, 1977.

Leal, Anita, Sex Inequities in Classroom Interaction: An Evaluation of an Intervention, Unpublished doctoral dissertation, Stanford University, 1985.

Lotan, Rachel A., Understanding the Theories: Training Teachers for Implementation of Complex Instructional Technology, Unpublished doctoral dissertation, Stanford University, 1985.

Mata, Susana C., Interdependence and Management - Teachers and Teacher Aides in Bilingual Classrooms, Unpublished doctoral dissertation, Stanford University, 1985.

McLaughlin, Milbrey W., "Implementation as Mutual Adaptation: Changes in Classroom Organization", Teachers College Record, 1976, 77 (3), 339-351.

McLaughlin, M.W. and D. Marsh, "Staff Development and School Change", Teachers College Record, 1978, 80(1), 69-94.

Navarrete, Cecilia, Problem Resolution in Small Group Interaction - A Bilingual Classroom Study, Unpublished doctoral dissertation, Stanford University, 1985.

Neves, Andrea, The Effect of Various Input on the Second Language Acquisition of Mexican American Children in Nine Elementary School Classrooms, Unpublished doctoral dissertation, Stanford University, 1983.

Parchment, Charles, The Role of the Principal in the Implementation of a Complex Instructional Program, Dissertation in Progress, Stanford University, forthcoming.

Rosenholtz, Stephen, Effect of Task Arrangements and Management Systems on Task Engagement of Low Achieving Students, Unpublished doctoral dissertation, Stanford University, 1981.

Sarason, Seymour B., The Culture of The School and the Problem of Change, Boston: Allyn and Bacon, 1971.

Schlechty, P.C. and Whitford, B.L., "The Organizational Context of School Systems and the Functions of Staff Development", in Griffin, G.A. (ed), Staff Development, Eighty-second Yearbook of the National Society for the Study of Education, Part II., Chicago, Illinois, NSSE, 1983, 62-91.

Smith, L. and P. Keith, Anatomy of Educational Innovation: An Organizational Analysis of an Elementary School, New York: Wiley, 1971.

Sprinthall, N.A. and L. Thies-Sprinthall, "The Teacher as an Adult Learner: A Cognitive-Developmental View", in Griffin, G.A. (ed), Staff Development, Eighty-second Yearbook of the National Society for the Study of Education, Part II., Chicago, Illinois, NSSE, 1983, 13-35.

Stevenson, Brenda J.U., An Analysis of the Relationship of Student-Student Consultation to Academic Performance in Differentiated Classroom Settings, Unpublished doctoral dissertation, Stanford University, 1982.

Weatherly, R. and M. Lipsky, "Street-level Bureaucrats and Institutional Innovation: Implementing Special Education Reform", Harvard Educational Review, 1977, 47(2), 171-197.

Zack, Marcia, Managing the Classroom Using Coooerative Groupwork: An Assessment, Dissertation in Progress, Stanford University, forthcoming.